AMENDMENTS TO THE CLAIMS

1.   (Currently Amended)   A method of determining <u>a line pattern or space between the line patterns arranged in plural line patterns</u> ~~a concavity and/or a convexity~~ on a sample, comprising the steps of:

scanning a portion <u>including edge of line pattern on</u> [[of]] the sample ~~including a plurality of convex patterns formed thereon~~ with a charged particle beam;

forming a <u>derivative waveform based on a profile waveform formed by detecting</u> ~~profile waveform based on~~ charged particles emitted from the scanned portion of the sample;

<u>acquiring a first distance between a top of the peak and a foot portion of the peak of one side in the peak of the derivative waveform, and a second distance between a top of the peak and a foot portion of the peak of the other side in the peak of the derivative waveform; and</u>

<u>judging the longer distance side in the both side as the line pattern or the shorter distance side in the both side as the space between the line patterns, based on the comparing the first distance with</u> ~~forming a derivative waveform based on the formed profile waveform;~~

~~comparing a first distance, along a baseline, between a peak top of a first side of the derivative waveform and a position where the derivative waveform converges, with a second distance, along the baseline, between a peak top of a second side of the derivative waveform and a position where the derivative waveform converges, about one side of the convex pattern; and~~

~~determining when the foot portion on one side of said peak converges more gradually than the foot portion on the other side, that a portion of said sample corresponding to a non-peak portion of the profile waveform which is continuous from the foot portion on the one side to be a convex portion, and that a portion of the sample corresponding to a non-peak portion of the profile waveform which is continuous from the foot portion on the other side is a concave portion that a convex part is on the first~~

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~~side of the formed waveform and that a concave part is on the second side thereof, if~~ ~~the first distance is greater than~~ the second distance.

2.   (Currently Amended)   A method of determining a <u>line pattern or</u> <u>space between the line patterns arranged in plural line patterns</u> ~~concavity and/or a~~ ~~convexity on a sample~~, comprising the steps of:

scanning a portion <u>including edge of line pattern on</u> [[of]] the sample ~~including a plurality of concave patterns formed thereon~~ with a charged particle beam;

forming a <u>derivative waveform based on a profile waveform formed by</u> <u>detecting</u> ~~profile waveform based on~~ charged particles emitted from the scanned portion of the sample;

<u>acquiring a first distance between a top of the peak and a foot portion of</u> <u>the peak of one side in the peak of the derivative waveform, and a second distance</u> <u>between a top of the peak and a foot portion of the peak of the other side in the peak of</u> <u>the derivative waveform; and</u>

<u>judging the longer distance side in the both side as the line pattern or the</u> <u>shorter distance side in the both side as the space between the line patterns, based on</u> <u>the comparing the first distance with</u> ~~forming a derivative waveform based on the~~ ~~formed profile waveform;~~

~~comparing a first distance, along a baseline, between a peak top of a first~~ ~~side of the derivative waveform and a position where the derivative waveform~~ ~~converges, with a second distance, along the baseline, between a peak top of a second~~ ~~side of the derivative waveform and a position where the derivative waveform~~ ~~converges about one side of the concave pattern;~~

~~determining that a concave part is on the first side of the formed waveform~~ ~~and that a convex part is on~~ the second side thereof, if the first distance is smaller than the second distance.

3.   (Previously Presented)   The method of determining the concavity and/or convexity on a sample according to claim 1 or 2, wherein the charged particle beam is incident on the plane of a substrate perpendicularly.

4.   (Original)   The method of determining the concavity and convexity on a sample according to claim 3, wherein said profile waveform is created based on a charged particle emitted from a location of said sample that has been scanned as the charged particle beam that is perpendicularly incident on the sample is scanned by a scanning deflector.

5.   (Original)   The pattern position detection method according to claim 1 or 2, wherein the position of a pattern on said sample is identified based on the information about the concave and/or convex portions that have been determined.

6.   (Original)   The pattern position detection method according to claim 1 or 2, wherein a convex-concave pattern formed on a substrate is scanned by a charged particle beam, a profile waveform is created based on a reflected or secondary charged particle emitted from a scanned location, and a specific position of said pattern on said substrate is detected based on pattern convex-concave information obtained by said method of determining the concavity and convexity on a sample.

7.   (Original)   The pattern position detection method according to claim 6, wherein a comparison is made with concavity-convexity information about a pre-registered model, in order to detect a specific position on said pattern on said sample.

8.   (Original)   The pattern position detection method according to claim 6, wherein a comparison is made with the profile shape of a pre-registered model, and an error is detected if an evaluation value indicating the difference in their profile shapes exceeds a predetermined value.

9.   (Original)   The pattern position detection method according to claim 6, wherein a comparison is made with the number of edges in a pre-registered model, and an error is detected if the numbers of edges exceed a predetermined value.

10.   (Currently Amended)   A method of determining a line pattern or space between the line patterns arranged in plural line patterns ~~concavity and/or a convexity~~ on a sample, comprising the steps of:

scanning a portion including edge of line pattern on [[of]] the sample including a plurality of convex and/or concave patterns formed thereon with a charged particle beam;

forming a derivative waveform based on a profile waveform formed by detecting ~~profile waveform based on~~ a charged particles emitted from the scanned portion of the sample;

acquiring a first distance between a top of the peak and a foot portion of the peak of one side in the peak of the derivative waveform, and a second distance between a top of the peak and a foot portion of the peak of the other side in the peak of the derivative waveform; and

judging the longer distance side in the both side as the line pattern or the shorter distance side in the both side as the space between the line patterns, based on the comparing the first distance with ~~forming a derivative waveform based on the formed of said profile waveform;~~

~~detecting a pair of continuous positive and negative peaks in the differentiated waveform;~~

~~comparing for each pair of continuous positive and negative peaks in the derivative waveform, a first distance in a negative peak of a pair of the continuous positive and negative peaks between a peak position and a position where the derivative waveform reaches zero or converges, with a second distance in a positive peak of the pair of the continuous positive and negative peaks between a peak position and a position where the derivative waveform reaches zero or converges; and~~

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~~determining that a convex part is a portion on the sample that corresponds~~ ~~to a non-peak portion of the derivative waveform where a negative peak converges, and~~ ~~that a concave part is a portion on the sample that corresponds to a non-peak portion of~~ ~~the derivative waveform where a positive peak converges, if the first distance is greater~~ ~~longer than~~ the second distance.

11.   (Currently Amended)   A charged particle beam apparatus comprising:

a charged particle source,

a scanning deflector for scanning a charged particle beam emitted by said charged particle source,

a detector for detecting a charged particle emitted by a sample irradiated with said charged particle beam, and

a control processor that comprises:

a profile waveform forming means for forming a profile waveform of a portion of the sample that has been irradiated with a charged particle beam based on a detection output of the detector;

a derivative waveform forming means for forming a derivative waveform based on the formed profile waveform;

<u>acquiring means for acquiring a first distance between a top of the peak and a foot portion of the peak of one side in the peak of the derivative waveform, and a second distance between a top of the peak and a foot portion of the peak of the other side in the peak of the derivative waveform; and</u>

~~a comparison means for comparing a first distance, along a baseline,~~ ~~between a peak top of a first side of the derivative waveform and a position where the~~ ~~derivative waveform converges, with a second distance, along the baseline, between a~~ ~~peak top of a second side of the derivative waveform and a position where the~~ ~~derivative waveform converges; and~~

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judging means for judging the longer distance side in the both side as the line pattern or the shorter distance side in the both side as the space between the line patterns, based on the comparing the first distance with

~~a determination means for determining that a convex part is on the first side of the formed waveform and that a concave part is on the second side thereof, if the first distance is greater than~~ the second distance.